Scope of Claims

1. An electronic camera that performs gradation conversion with respect to a photographed image signal, comprising:

a dark area gradation conversion unit that performs gradation conversion on the image signal in accordance with a linear conversion characteristic when an input gradation value of the image signal is darker than a preset value; and

a bright area gradation conversion unit that performs gradation conversion on the image signal in accordance with a nonlinear characteristic when the input gradation value of the image signal is brighter than the preset value;

wherein the nonlinear characteristic satisfies both of the following conditions:

(1)   the nonlinear characteristic has a slope that substantially equalizes an average noise amplitude of the image signal without being based on the output gradation value; and

(2)   the nonlinear characteristic is offset so as to be continuous with a gradation conversion characteristic of the dark area gradation conversion unit.

2. The electronic camera according to claim 1, wherein the dark area gradation conversion unit outputs the input gradation value X as the output gradation value Y without any change.

3. The electronic camera according to claim 1, wherein the bright area gradation conversion unit outputs the output gradation value Y of the following equation:

$$Y = A \cdot \sqrt{X} + C$$

where X is the input gradation value, A is a proportionality coefficient, and C is an offset value to adjusted for making continuous with the characteristic of the dark area gradation conversion unit).

4. The electronic camera according to claim 1, wherein when the input gradation value of the image signal is brighter than a second preset value, the bright area gradation conversion unit

performs gradation conversion of the image signal in accordance with a linear conversion characteristic continuous with the nonlinear gradation conversion characteristic.

5. The electronic camera according to claim 1, wherein at the bright area gradation conversion unit and the dark area gradation conversion unit, at least two combinations of gradation conversion characteristics are provided in advance, either one of which can be selected.

6. The electronic camera according to claim 1, further comprising with a data compression unit having at least a first compression mode that compresses data of the image signal after performing gradation conversion on the image signal through the dark area gradation conversion unit or the bright area gradation conversion unit, and a second compression mode that compresses data of the image signal without the signal passing through the dark area gradation conversion unit or the bright area gradation conversion unit, wherein either one of the modes can be selected.

7. The electronic camera according to claim 1, further comprising a data compression unit having at least a first compression mode that compresses data of the image signal after performing gradation conversion on the image signal through the dark area gradation conversion unit or the bright area gradation conversion unit, and a non-compression mode that does not pass through the dark area gradation conversion unit or the bright area gradation conversion unit and does not compress the data of the image signal, wherein either one of the modes can be selected.

8. An image processing program which allows a computer to function as:

    (a) a dark area gradation conversion unit that performs gradation conversion on an image signal in accordance with a linear conversion characteristic, when an input gradation value of the image signal is darker than a preset value; and

(b) a bright area gradation conversion unit that performs gradation conversion on an image signal in accordance with a nonlinear characteristic, when the input gradation value of the image signal is brighter than a preset value, the nonlinear characteristic satisfying both of the following conditions:

(1) the nonlinear characteristic has a slope that substantially equalizes an average noise amplitude of the image signal without being based on the output gradation value; and

(2) the nonlinear characteristic is offset so as to be continuous with a gradation conversion characteristic of the dark area gradation conversion unit.

9. A mechanically readable recording medium that stores the image processing program according to claim 8.

10. An image processing method for performing gradation conversion with respect to an input image signal, comprising:

a dark area gradation conversion step for performing gradation conversion on the image signal in accordance with a linear conversion characteristic when an input gradation value of the image signal is darker than a preset value; and,

a bright area gradation conversion step for performing gradation conversion on the image signal in accordance with a nonlinear characteristic when the input gradation value of the image signal is brighter than a preset value, the nonlinear characteristic satisfying both of the following conditions:

(1) the nonlinear characteristic has a slope that equalizes an average noise amplitude of the image signal without being based on the output gradation value; and

(2) the nonlinear characteristic is offset so as to be continuous with a gradation conversion characteristic of the dark area gradation conversion unit.